

**From:** [Tzhone, Stephen](#)  
**To:** [Bartenfelder, David](#)  
**Cc:** [Berg, Marlene](#)  
**Subject:** RE: Arkwood  
**Date:** Thursday, January 21, 2016 5:26:00 PM

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Yes, those three are the questions from Jim Fleer/McKesson.

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**From:** Bartenfelder, David  
**Sent:** Thursday, January 21, 2016 5:12 PM  
**To:** Tzhone, Stephen  
**Cc:** Berg, Marlene  
**Subject:** RE: Arkwood

Steve-

Are these the three questions you are still looking for feedback? If not, are they imbedded in one of the attached files that I seemed to have missed?

Dave

1. What regulatory (or risk) standard will be applied to the various samples collected?  
Previous water samples from New Cricket Spring were sampled and analyzed without filtration. Samples were collected with stream flows of approximately 5 gallons per minute and 66 gallons per minute. The analytical results from the previous samples did not indicate significant interferences and TEQ concentrations were reported below 30 parts per quadrillion. The current discussion is to collect stream samples at the point of greatest turbidity resulting from a high flow condition (i.e., expected worst case conditions relative to prospective dioxin transport). These samples may be impacted by solids being washed from the system which will fall out as sediment when conditions are less turbulent. Sediment samples downstream from the treatment plant effluent were previously collected and reported (2012).
2. How will the potential impacts from off-Site soils (entrained in samples or "suspended" due to turbulent flow) be mitigated during this process? Seep/intermittent spring flows may be impacted from non-Site related soil sources including those related to the adjacent railroad tracks (potentially affected by a century of deteriorating creosote-soaked railroad ties (including an area used for staging a large number of used railroad ties along the spur line adjacent to the Site) and soot impacted by dioxins from incomplete combustion of diesel fuel or other fuels) and along the adjacent roadway (incomplete combustion of diesel and other fuels). Sediments incidentally entrained in samples, mobilized by turbulent overland flow, or mobilized by subsurface flows may adversely impact the collected samples.
3. As this process has been discussed, it appears contradictory to the incremental sampling methodology established for risk analysis relative to soils. In the soil process, the intent was to develop composite data so localized high and localized low concentrations did not skew the evaluation. As discussed, the intention of the high flow process is to identify the presumed maximum dioxin concentration. How will the EPA evaluate the data sets (the two



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prior data points and any data generated during the high flow event including seep and ditch samples) developed relative to any potential risk conditions? During the soil evaluation process, we had a clear understanding of how the data would be evaluated relative to risk. We do not currently have any understanding of the risk analysis process other than potential comparison to a drinking water standard for the water component (which we believe is an inappropriate comparison for these high turbidity samples from sources considered inadequate as drinking water sources).

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**From:** Tzhone, Stephen  
**Sent:** Tuesday, January 19, 2016 5:55 PM  
**To:** Bartenfelder, David <[Bartenfelder.David@epa.gov](mailto:Bartenfelder.David@epa.gov)>  
**Cc:** Berg, Marlene <[Berg.Marlene@epa.gov](mailto:Berg.Marlene@epa.gov)>; Huling, Scott <[huling.scott@epa.gov](mailto:huling.scott@epa.gov)>  
**Subject:** RE: Arkwood

Hi Dave,

Glad you're back!

I just got off the phone with the McKesson project manager. They submitted gw responses to our comments last Friday (I'll send in next email), but he indicated that they would still like clarity for the questions they sent on 12/31/2015 (I had forwarded those to you in an email dated 1/4/2016).

Can you take a look and let me know what you think?

Thanks,

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**From:** Bartenfelder, David  
**Sent:** Tuesday, January 12, 2016 2:55 PM  
**To:** Tzhone, Stephen  
**Cc:** Berg, Marlene; Huling, Scott  
**Subject:** Arkwood

Steve-

Sorry for taking so long to get back to you, but the recovery from my surgery in December experienced some major setbacks with a post-operative infection.

Let me first say that I agree with the technical points that Scott wrote in his 12/10 email. I would like to augment some of Scott's thoughts with the following thoughts:

1. For Scott's first point, there is not a SF regulatory designation of colloid size. I would suggest not using colloid, but using facilitated transport instead. This is probably a better presentation of the issue, colloid might be too narrow of an interpretation. In fact, Region 4 developed an internal guidance that actually speaks to the issues of facilitated transport on groundwater and the analytics associated with the many congeners. The lead for the effort was Kay Wischkaemper, who has since retired to Texas. Colloid size particles play a large role in the greater migration of low solubility COC in groundwater, Kay found PCBs much deeper in an Alabama aquifer than expected. However, other particle sizes also contribute and should be evaluated. This could include nanomaterials that are smaller than colloid, but also some of the larger clay and silt particles. All these particles are initially worth considering. If there were some filtered and non-filtered samples, one could have a three-point decision logic: both samples do not present PCBs at a level above regulatory concern and therefore are not an issue, the filtered samples are below regulatory concern but the non-filtered are above regulatory concern and indicating the facilitated transport mechanism is viable (consideration needs to be given on the sample collection method and filter size (e.g., 0.45 micron or other)), and lastly if both the filtered and non-filtered samples are above the regulatory level then there is sufficient water solubility possibly due to near proximity NAPL presence and/or co-solvency and there are factors supporting the facilitated transport of PCBs.
2. I also agree with Scott's second point, but think it is less an issue for groundwater as it is for surface water (I do not plan to get into the surface water discussion here).
3. Once again I agree with Scott. Any sampling design would need to incorporate safeguards to either eliminate, minimize artifacts or be able to account for them.

The attached Word file raised some good points when considering the path-forward at the site. The first discussion point raised the issue of turbid flow greater than 30-40 gpm. I suspect this was mainly for surface water and not an issue for groundwater. The third point raises the issue of filtered versus non-filter samples. This is worth undertaking as a scoping study and address the need or not to continue more exhaustively (see #1 above). Lastly, Jim Fleer raises the issues of filtering not collecting all the "colloid" material and this is a valid concern depending on the sample collection approach and filter size used. Serious thought needs to be given to this activity and if a more detailed filtering approach is undertaken. Scott can give you some good advice with this.

In conclusion, I would not make too much out of "facilitated" transport unless some preliminary investigation warrants it since it might not be an issue at all or one of minor consequence compared to other issues at the site.

Hope this helps, but contact me if you have any questions. Best if you send me an email instead of calling since I will probably be working from home for at least another week.

Dave

Dave Bartenfelder, Ph.D.

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